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Economic and environmental questions: Science and technology for development

Progress made in the implementation of and follow-up to the outcomes of the World Summit on the Information Society at the regional and international levels

Report of the Secretary-General

Summary

This report has been prepared in response to Economic and Social Council resolution 2006/46, which requested the Secretary-General of the United Nations to inform the Commission on Science and Technology for Development about the implementation of the outcomes of the World Summit on the Information Society (WSIS). The report highlights major activities carried out by stakeholders in 2017 to implement WSIS outcomes. It has been prepared by the secretariat of the United Nations Conference on Trade and Development (UNCTAD), following information provided by entities in the United Nations system, other international organizations and stakeholders.

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Introduction

1. This report has been prepared in response to Economic and Social Council resolution 2006/46. It includes information provided by 33 United Nations entities and other international organizations and stakeholders, [1] responding to a letter from the Secretary-General of UNCTAD inviting contributions on trends, achievements and obstacles in the implementation of WSIS outcomes. The report summarizes major developments and activities in 2017. Further information on the implementation of WSIS outcomes is available in document E/CN.16/2018/CRP.2.

I. Key trends

A. Sustainable development

2. The years since WSIS have seen remarkable developments in information and communications technology (ICTs) and services and in their impact on economic and social development. Many new opportunities and challenges have emerged that affect the implementation of WSIS outcomes. The 2030 Agenda for Sustainable Development recognized that the spread of ICTs and connectivity has great potential to accelerate sustainable development. That potential lies partly in their ability to improve responses to specific developmental challenges but also through their capacity to empower individuals to address their own priorities and, increasingly, through improvements in the overall structure and efficiency of national economies and public services.

3. However, the rapid changes that have occurred and continue to occur have complex results. These technologies disrupt, displace or alter many of the institutional structures, business models and patterns of social behaviour that have underpinned economic and social development. Inequalities in ICT access and use can also lead to inequalities in impact. International organizations have emphasized the importance, in leveraging developmental value and reducing inequality, of enabling policy and regulatory environments for investment and innovation, integrating ICTs into national and sectoral development strategies, and involving all stakeholders in the development of appropriate policies and implementation plans.

[1] Association for Progressive Communications (APC); Council of Europe; Economic and Social Commission for Asia and the Pacific (ESCAP); Economic and Social Commission for Western Asia (ESCWA); Economic Commission for Africa (ECA); Economic Commission for Europe (ECE); Economic Commission for Latin America and the Caribbean (ECLAC); End Child Prostitution, Child Pornography and Trafficking of Children for Sexual Purposes International; European Commission; Food and Agriculture Organization of the United Nations (FAO); International Chamber of Commerce; International Federation of Library Associations and Institutions (IFLA); International Telecommunication Union (ITU); International Trade Centre; Internet Corporation for Assigned Names and Numbers; Internet Governance Forum (IGF) Secretariat; Internet Society (ISOC); Organization for Economic Cooperation and Development (OECD); United Nations Children's Fund; UNCTAD; United Nations Department of Economic and Social Affairs (DESA); United Nations Economic, Scientific and Cultural Organization (UNESCO); United Nations Environment Programme (UNEP); United Nations Industrial Development Organization (UNIDO); United Nations Institute for Training and Research; United Nations Office on Drugs and Crime; Universal Postal Union; World Bank; World Food Programme; World Health Organization (WHO); World Intellectual Property Organization (WIPO); World Meteorological Organization (WMO); World Trade Organization (WTO). See http://unctad.org/en/Pages/CSTD/WSIS-UNSG-Report.aspx (accessed 28 February 2018).

B. Steady but uneven growth in connectivity and use of information and communications technologies

4. Access to ICTs continues to grow worldwide but remains uneven, with higher levels of connectivity and usage in developed countries, compared with developing countries.[2] Much needs to be done to meet the commitment of the 2030 Agenda, that no one should be left behind in connectivity and access.

5. Mobile cellular and broadband connectivity are now much more widely available than fixed connectivity, particularly in developing countries. Mobile cellular subscriptions make up more than 90 per cent of voice subscriptions, while the number of fixed telephone lines is in gradual decline. There is now more than one mobile broadband subscription for every two people worldwide, a trend facilitated by the increased pervasiveness of smartphones that can make use of networks offering greater bandwidth. According to ITU estimates, less than half the world's inhabitants now make use of the Internet, and a little more than half of households have Internet access at home.

6. The rate of growth in these indicators is, however, gradual, and insufficient to achieve the Sustainable Development Goal target of universal affordable Internet access in least developed countries by 2020. ITU estimates that there were 97 mobile broadband subscriptions per 100 people in developed countries in 2017, compared with 48 in developing countries and 22 in the least developed countries. Average broadband speeds are generally lower in developing countries, while the cost of using services and devices there is typically higher as a proportion of average income than in developed countries. This inhibits take-up of online services and reduces their potential impact on development.

7. There are also considerable differences in access and use within countries. The gender digital divide, which is especially acute in the least developed countries, does not appear to be diminishing. While the proportion of young people using the Internet is over 70 per cent worldwide, Internet adoption is much lower among the elderly. Those living in rural areas and persons with disabilities continue to be disadvantaged. Low literacy levels also adversely affect adoption rates.

C. Continued rapid changes in technology

8. New technologies and services are constantly emerging, adding to the range and diversity of applications and potential impacts of ICTs on all aspects of economy, society and development. A new wave of innovation, which has been termed the "fourth industrial revolution" or the "second machine age", includes artificial intelligence, machine learning and advanced robotics, big data and algorithmic decision-making, virtual and augmented reality, blockchain technologies, autonomous vehicles, the Internet of Things and quantum computing. There is particular interest in the potential of digitalization to facilitate smart cities, in which ICTs are widely used to improve economic and social welfare, for example through better traffic and waste management.

9. Experience since WSIS has shown how difficult it is to anticipate the pace at which specific ICTs will be adopted, and therefore to develop appropriate policies to maximize potential benefits and mitigate potential risks. Considerations of equality and inclusiveness will be important in determining the impact of current and new technologies.

D. Digital economy

10. According to the UNCTAD *Information Economy Report 2017: Digitalization, Trade and Development*, the proportion of economic activity that takes place online is growing rapidly. Global production of ICT goods and services now accounts for an estimated 6.5 per cent of global gross domestic product, while exports of ICT services

[2] Data in this section are derived from ITU, 2017 *Measuring the Information Society 2017*, Vol. 1 (Geneva).

grew by 40 per cent between 2010 and 2015. According to UNCTAD estimates, worldwide e-commerce sales in 2015 reached over $25 trillion, most of which were transactions between businesses.[3]

11. This expanding digital economy is a complex and evolving ecosystem, with a core of digital sector businesses providing infrastructure, software and data management services to platform and other digital enterprises and to a wider group of digitalized businesses that use ICTs extensively to gain competitive advantage through enhanced productivity and customer reach.

12. The growth of the digital economy poses challenges for Governments and businesses, particularly in developing countries. Many least developed countries are poorly prepared to capture the opportunities arising from digitalization. Investment in readiness for e-commerce is essential if they are to meet the challenge of increased competition in global markets and exploit the dynamism of ICTs to foster prosperity. As well as enhancing infrastructure, they must respond to the changing skills requirements of a changing world economy. All countries need not just to reskill workforces but to prepare for a labour market in which the skills of individuals, communities and countries will require continual upgrading and adjustment in response to further changes in technology and markets.

E. Cybersecurity

13. Cybersecurity is an increasingly important theme in international policy concerned with the digital economy and other aspects of the Information Society. There has been a growing incidence of serious cybersecurity attacks, some of which have had significant impacts on individuals and public services. Critical vulnerabilities in software and hardware have been identified, requiring rapid interventions by infrastructure and service providers, supported by national cybersecurity response teams.

14. Concern has been expressed about security risks associated with the Internet of Things. Some 20 billion Internet-of-Things devices are estimated to be in use today, and this number is expected to double within five years.[4] There are no agreed international security standards for new devices, and many which have already been deployed are insecure. This increases the vulnerability not only of device owners, but of societies in general, should these devices be implicated in distributed denial of service or other large-scale cyberattacks.

15. International attention is focused on efforts to improve cybersecurity awareness among users, the improvement of security in products and services, and the need for multi-stakeholder cooperation that can respond rapidly to present threats and anticipate future threats.

F. Measuring the Information Society

16. Measuring progress towards the Information Society is challenging because of rapid changes in the potential of technology, the quality of connectivity, the capabilities of devices, the range of services and their changing impacts on economies and societies. Measures of access and use need regular updating to reflect advances in technology, such as broadband networks, smartphones and online platforms.

17. The need for more comprehensive, detailed and disaggregated data on ICTs and their impacts will intensify as currently available ICTs become more pervasive and newer digital technologies become available. Big data analysis, which leverages digital information, cloud storage and the analytical power of computing, offers new ways of understanding ICT impacts, but is dependent on data quality and raises complex issues of privacy, data protection and cybersecurity. The value of better data is also limited by the

[3] http://unctad.org/en/PublicationsLibrary/ier2017_en.pdf

[4] https://www.statista.com/statistics/471264/iot-number-of-connected-devices-worldwide/

capacity of Governments to act upon it, which requires both human capacity and financial resources.

II. Implementation and follow-up at the regional level

A. Africa

18. Information and communications technologies are less pervasive in Africa, which is less connected to the Internet than other regions. ECA coordinates regional activities to address these challenges of ICT access and use. It has identified broadband policies and strategies, pricing, universal access, harmonization of policy and regulation, and broadband for regional integration as policy priorities. It published a report entitled "*Towards Improved Access to Broadband in Africa*",[5] and a review of the legal and regulatory framework for ICTs in selected countries.[6]

19. The African Network Information Centre and the African Network Operators Group organized the Africa Internet Summit in May and June.[7] The African Union Commission and Economic Commission for Africa organized the African Internet Governance Forum (IGF), which was held in Egypt in November.[8]

B. Asia and the Pacific

20. ESCAP coordinates regional reviews of WSIS implementation in Asia and the Pacific, conducts analytical studies and provides support to policy development by Governments in the region. It identified six priority challenges which need to be addressed in order to maximize the value of ICTs, including new developments such as artificial intelligence. These include narrowing the growing digital divide between countries in the region, identifying financing mechanisms for infrastructure roll-out, improving the efficiency of Internet traffic management, prioritizing drivers of broadband connectivity, increasing the use of ICTs in public administration and facilitating women's economic empowerment.[9]

21. Member States of ESCAP have agreed upon a regional cooperation framework for the Asia–Pacific information superhighway, a regional broadband initiative to improve the connectivity of landlocked developing countries through links to submarine cables and the deployment of Internet exchange points. The first steering committee meeting focused on priority challenges for sub regional planning.[10]

C. Western Asia

22. ESCWA promotes efforts towards regional integration in the Arab region, and addresses regional differences in ICT access and use. It issued a report entitled "*Next Generation Digital Infrastructure: Challenges and Opportunities for Development in the Arab Region*" to facilitate the discussion of regional priorities.[11]

[5] https://www.uneca.org/sites/default/files/PublicationFiles/towards_improved_access_to_broadband_inafrica.pdf

[6] https://www.uneca.org/sites/default/files/PublicationFiles/review_of_the_legal_and_regulatory_framework.pdf

[7] https://internetsummitafrica.org/

[8] http://afigf.org/

[9] http://www.unescap.org/our-work/ict-disaster-risk-reduction

[10] http://www.unescap.org/our-work/ict-disaster-risk-reduction/asia-pacific-information-superhighway/about

[11] https://www.unescwa.org/sites/www.unescwa.org/files/events/files/next-generation-digital-infrastructure-arab-region-technical-en.pdf

23. In May, the Organization launched the Arab High-level Forum on WSIS and the 2030 Agenda for Sustainable Development, a regional platform for experience sharing and partnership development, whose first meeting adopted the Beirut Consensus on Transformation and Digital Economy in the Arab Region.[12] An expert group meeting on innovation and technology on meeting the objectives of the 2030 Agenda was held in December. [13] A forthcoming study will discuss the achievement of Sustainable Development Goal targets by leveraging the power of ICTs and will be issued with a companion study on employment, industry and economic growth.

24. Working with the League of Arab States, ESCWA finalized and adopted the revised Arab Regional Road Map for Internet Governance, which will guide future development of the Arab IGF. It published a study entitled "*Smart Digital Transformation in Government*" and held an expert group meeting on the use of emerging technologies to improve transparency and accountability.

D. Europe

25. ECE contributes to e-commerce development through the United Nations Centre for Trade Facilitation and Electronic Business, development of electronic data interchanges, intelligent transport systems and information sharing on environmental issues. It developed new recommendations in 2017, following adoption of the Agreement on Trade Facilitation of WTO, and supported the adoption of single-window and electronic business development in the Eurasian Economic Union.

26. The Council of Europe adopted recommendations on issues including electronic voting and big data for culture, literacy and democracy, as well as guidelines on personal data in the big data environment. Threats associated with cybersecurity and the sexual exploitation of children remained priorities for the Council. A youth campaign sought to reduce hate speech and develop youth participation and citizenship.[14] Judgements of the European Court of Human Rights addressed challenges of the Internet concerned with freedom of expression and respect for privacy and family life.

E. Latin America and the Caribbean

27. ECLAC implements WSIS outcomes through the Digital Agenda for Latin America and the Caribbean, the current version of which was approved in 2015. A revised 2020 digital agenda was prepared for discussion at the sixth Ministerial Conference on the Information Society in Latin America and the Caribbean, to be held in 2018. Its priorities include infrastructure; the digital economy; digital government; culture, inclusion and skills; governance and emergency technologies.[15] Work continued towards the development of a digital single market in Latin America.[16]

28. ECLAC supports regional observatories on the Information Society (Observatory for the Information Society in Latin America and the Caribbean)[17] and broadband (Regional Broadband Observatory)[18] to improve understanding of access, use and impact of ICTs. The Organization held regional forums on ICTs and education, inclusion in the digital economy and alignment of WSIS implementation with the Sustainable Development Goals and is intensifying work on big data for measuring the digital economy.

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[12] https://www.unescwa.org/events/arab-forum-information-society-sustainable-development.

[13] https://www.unescwa.org/sites/www.unescwa.org/files/events/files/sdg-innovation-technology-arab-region-agenda-en.pdf.

[14] https://www.nohatespeechmovement.org/.

[15] https://www.cepal.org/en/pressreleases/paises-america-latina-caribe-iniciaron-proceso-discusion-la-nueva-agenda-digital.

[16] http://scioteca.caf.com/bitstream/handle/123456789/980/DigitalMarketStrategy-7dic.pdf.

[17] https://www.cepal.org/cgi-bin/getprod.asp?xml=/socinfo/noticias/paginas/8/44988/P44988.xml&xsl=/socinfo/tpl-i/p18f-st.xsl&base=/socinfo/tpl-i/top-bottom.xsl.

[18] https://www.cepal.org/es/observatorio-regional-de-banda-ancha.

III. Implementation and follow-up at the international level

A. United Nations Group on the Information Society

29. The United Nations Group on the Information Society was established by the Chief Executives Board for Coordination in 2006 as an inter-agency mechanism to coordinate implementation of WSIS outcomes throughout the United Nations system.[19] It meets annually during the WSIS Forum.

B. General Assembly and Economic and Social Council

30. In July, the Economic and Social Council adopted resolution 2017/21 on assessment of the progress made in the implementation of and follow-up to the outcomes of WSIS.[20]

31. In December, the General Assembly adopted resolution 72/200 on ICTs for sustainable development.[21]

C. Commission on Science and Technology for Development

32. The twentieth session of the Commission, held in May, included high-level round tables on eradicating poverty by promoting sustainable development, expanding opportunities and progress made in implementing WSIS outcomes. It discussed priority themes concerned with innovation to support the implementation of the Sustainable Development Goals and the role of science, technology and innovation in ensuring food security.[22] Throughout the year, a working group of the Commission considered the issue of enhanced cooperation.[23] The working group is addressed in section F.2 below.

D. Facilitation and coordination of multi-stakeholder implementation

33. The annual WSIS Forum, which took place in Geneva in June under the theme "Information and knowledge societies for the Sustainable Development Goals", attracted more than 2,500 participants.[24] Its programme, developed through an open consultation process, included more than 200 workshops, information and collaborative sessions, as well as coordination meetings of the WSIS action lines. A high-level session addressed 14 themes concerned with different aspects of WSIS implementation, with a particular focus on multi-stakeholder participation.[25] Project prizes were awarded to recognize excellence in implementing projects and initiatives in each action line.[26]

34. The Broadband Commission for Sustainable Development, convened by ITU and UNESCO, draws together partners from the public and private sectors to advocate policies concerned with broadband deployment. During the year, multi-stakeholder working groups focused on digital scorecards, digital health, the digital gender divide, education, and space technologies.[27] The Commission issued an open letter to the United Nations High-level Political Forum on Sustainable Development advocating greater use of broadband in efforts to achieve the Sustainable Development Goals.[28]

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[19] http://www.ungis.org/Home.aspx.

[20] http://www.un.org/ga/search/view_doc.asp?symbol=E/RES/2017/21.

[21] https://undocs.org/en/A/RES/72/200.

[22] http://unctad.org/en/pages/MeetingDetails.aspx?meetingid=1272.

[23] http://unctad.org/en/Pages/CSTD/WGEC-2016-to-2018.aspx.

[24] https://www.itu.int/net4/wsis/forum/2017/; https://www.itu.int/net4/wsis/forum/2017/#outcomes.

[25] https://www.itu.int/en/itu-wsis/Documents/wf17/WSISForum2017_HighLevelTrackOutcomesStatements.pdf.

[26] https://www.itu.int/net4/wsis/prizes/2017/.

[27] http://www.broadbandcommission.org/workinggroups/Pages/spacetechnology.aspx.

[28] http://broadbandcommission.org/events/Documents/BBCom-HLPFOpenLetter2017-E.pdf.

35. A special session on digital inclusion was organized at the 2017 meeting of the World Economic Forum in conjunction with ITU and the Broadband Commission for Sustainable Development. Artificial intelligence and the fourth industrial revolution featured prominently in the Forum agenda and its initiative on shaping the future of digital economy and society.[29]

E. Civil society, business and multi-stakeholder partnerships

36. Activities that support WSIS objectives are implemented by many stakeholders, including business, civil society organizations and the academic and technical communities, and through multi-stakeholder partnerships. ITU maintains the WSIS Stocktaking Platform, which provides information on more than 8,000 ICT and development activities carried out by diverse stakeholders, reaching 300,000 registered stakeholders.[30] In 2017, ITU issued "*WSIS Stocktaking: Success Stories 2017*",[31] and the Platform now includes an ICTs for a sustainable world (ICT4SDG) application based on a matrix of WSIS action lines and Sustainable Development Goals developed by action line facilitators.

37. The International Chamber of Commerce Commission on the Digital Economy published a policy statement, *ICT, Policy and Sustainable Economic Development*.[32] An initiative launched by the Commission, Business Action to Support the Information Society, works with businesses to support WSIS outcomes, including the WSIS Forum and IGF.[33]

38. The Global System for Mobile Communications Association represents mobile communications businesses. More than 100,000 people attended the Mobile World Congress in February.[34] The Association's annual review, *The Mobile Economy*, provides data on mobile connectivity and use, and was supplemented in 2017 by seven regional reports.[35] Other publications focused on regulatory approaches for the digital age and on e-health.

39. Civil society organizations play a prominent part in the WSIS Forum, IGF and other information society meetings. APC focuses on issues concerned with development, rights and governance, including gender-related aspects of the Internet.[36] IFLA is particularly concerned with access to information including public access facilities, information literacy and local content.

40. ISOC provides a forum for the technical and professional Internet community and others concerned with the development and maintenance of an open Internet. It produced the *2017 Internet Society Global Internet Report: Paths to our Digital Future*, which drew on extensive research to identify drivers for change that will affect the Internet and made recommendations concerning its future role within society.[37] ISOC also published reports on the following topics: infrastructure development and capacity-building in support of WSIS, the Internet and education, community networks, and Internet content blocking and shutdowns.[38] It provided technical training to more than 1,850 experts in developing countries.

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[29] https://www.weforum.org/events/world-economic-forum-annual-meeting-2017; https://www.weforum.org/system-initiatives/shaping-the-future-of-digital-economy-and-society.

[30] http://www.itu.int/net4/wsis/stocktakingp/en; http://www.itu.int/pub/S-POL-WSIS.REP-2017.

[31] https://www.itu.int/pub/S-POL-WSIS.SUCC_STORIES-2017 (accessed 23 February 2018).

[32] https://cdn.iccwbo.org/content/uploads/sites/3/2017/06/icc-ict-policy-and-sustainable-economic-development-2017.pdf.

[33] https://iccwbo.org/global-issues-trends/digital-growth/internet-governance/business-action-to-support-the-information-society-basis/.

[34] https://www.mobileworldcongress.com/.

[35] https://www.gsma.com/mobileeconomy/.

[36] https://www.apc.org/.

[37] https://future.internetsociety.org/wp-content/uploads/2017/09/2017-Internet-Society-Global-Internet-Report-Paths-to-Our-Digital-Future.pdf.

[38] https://www.internetsociety.org/wp-content/uploads/2017/11/ISOC-PolicyBrief-Shutdowns-20171109-EN.pdf.

F. Facilitation of action lines and selected implementation of activities of United Nations entities

1. Implementation of action lines

41. WSIS agreed on 11 action lines for implementation of its outcomes in 2005. The annual meeting of action-line facilitators took place during the WSIS Forum in June 2017.[39] An overview of the implementation of WSIS action lines for eradicating poverty and promoting prosperity in a changing world was published on the WSIS Forum.[40]

(a) The role of public governance authorities and all stakeholders in the promotion of ICTs for development (C1)

42. The contribution of ICTs to development plays an important part in the work of United Nations specialized agencies, multilateral organizations, international financial institutions and other stakeholders. The need for multi-stakeholder cooperation has been a hallmark of WSIS implementation.

43. The relationship between the Sustainable Development Goals and WSIS outcomes has been a focus of work by intergovernmental agencies and other stakeholders since the adoption of the 2030 Agenda for Sustainable Development. A matrix linking WSIS outcomes with the Sustainable Development Goals has been prepared by action-line facilitators.[41]

44. The World Bank worked with Governments and private sector partners in 2017 to establish the Digital Development Partnership, a platform for digital innovation and development financing in support of the outcomes of the *World Development Report 2016: Digital Dividends*.[42]

45. ITU held its quadrennial World Telecommunication Development Conference in Argentina in October, based on the theme, "ICT for Sustainable Development Goals". It agreed the ITU work programme on telecommunications development for the period to 2022.[43] The annual ITU Telecom World conference and exhibition was held in the Republic of Korea in September.[44]

(b) Information and communication infrastructure (C2)

46. Private sector businesses play the leading role in ICT infrastructure finance, development and deployment, responding to rapid changes in technology, services and markets. The World Bank and other international financial institutions also provide financial support for infrastructure projects in developing regions.

47. ITU works with Governments to support infrastructure deployment, including the development of national ICT strategies, policy and regulatory harmonization and the adoption of international standards in areas such as radio spectrum. Work includes the m-Powering Development initiative to extend benefits of mobile technology in development sectors, and the Smart Sustainable Development Model initiative, which links rural telecommunication development with disaster and risk management.

48. There has been increased attention to geographic areas where it has proved difficult to achieve adequate ICT access. ISOC published a report entitled "*Ensuring Sustainable Connectivity in Small Island Developing States*", including recommendations to Governments and international agencies.[45] The Broadband Commission for Sustainable

[39] https://www.itu.int/net4/wsis/forum/2017/Agenda/Session/355#documents

[40] https://www.itu.int/en/itu-wsis/Documents/wf17/WSISActionLinesSupportingImplementationOfSDGs-WSISForum2017.pdf

[41] https://www.itu.int/en/itu-wsis/Documents/wf17/WSISForum2017_WSIS-SDGsMatrix.pdf

[42] http://www.worldbank.org/en/programs/digital-development-partnership

[43] https://www.itu.int/en/ITU-D/Conferences/WTDC/WTDC17/Pages/About.aspx

[44] http://news.itu.int/5-things-to-watch-at-itu-telecom-world/

[45] https://www.internetsociety.org/resources/doc/2017/sidsreport/.

Development also initiated a working group on the needs of vulnerable countries.[46] Renewed interest has been raised in local networks, including proposed guidelines outlined in Spectrum Approaches for Community Networks, a policy brief issued by ISOC.[47] Innovative ways of improving connectivity to remote areas are also being explored by global technology companies,[48] some of which have raised new regulatory challenges.

(c) Access to information and knowledge (C3)

49. UNESCO leads the international community's work to build knowledge societies that can contribute to human rights, peace and sustainable development. To mark the International Day for Universal Access to Education in September, the International Programme for the Development of Communication hosted a series of talks from global, youth and community leaders on powering sustainable development with access to information.[49]

50. The gender digital divide is addressed by several international agencies. The Broadband Commission for Sustainable Development published recommendations for action to bridge the gender gap in Internet and broadband access and use, including improved understanding of barriers to access and integration of gender into strategies and budgets.[50] The United Nations High Commissioner for Human Rights published a report on ways to bridge the digital gender divide from a human rights perspective.[51]

51. The new disability strategy of the Council of Europe emphasizes the importance of facilitating accessibility of the Internet.[52] The Council also launched a study of the opportunities and risks for children with disabilities in the digital environment and published a revised edition of the *Internet Literacy Handbook*, offering guidance to users of all age groups seeking to navigate resources in the digital age.[53]

52. The 2017 report of the United Nations Children's Fund, *State of the World's Children*, focused on the opportunities and risks to children in a digital world. It included analysis of the impact of digital divides on children, and made recommendations summarized in the theme, "Harness the good, limit the harm" – to address the challenges identified and put children at the heart of digital policymaking.[54]

53. Public-access facilities play an important role in access to information and services. IFLA and the University of Washington produced the first *Development and Access to Information* report.[55] ITU published a report on digital financial services[56] and established the Financial Inclusion Global Initiative Symposium, in conjunction with the Bill and Melinda Gates Foundation, to provide a forum for dialogue between communications and financial service regulators.[57]

(d) Capacity-building (C4)

54. Education and capacity-building are crucial to enable developing countries to derive social and economic gains from technological innovation. United Nations agencies and other stakeholders organized many workshops and training programmes dealing with different aspects of WSIS implementation. These capacity-building events were aimed at policymakers, ICT professionals and users of ICTs.[58] For instance, e-learning courses of the

[46] http://broadbandcommission.org/workinggroups/Pages/vulnerablecountries.aspx.

[47] https://www.internetsociety.org/policybriefs/spectrum/.

[48] See, for example, Project Loon, https://x.company/loon/.

[49] https://en.unesco.org/events/2017-ipdc-talks-powering-sustainable-development-access-information.

[50] http://broadbandcommission.org/Documents/publications/WorkingGroupDigitalGenderDivide-report2017.pdf.

[51] http://www.ohchr.org/EN/HRBodies/HRC/RegularSessions/Session35/Documents/A_HRC_35_9_AEV.docx.

[52] https://www.coe.int/en/web/disability/strategy-2017-2023.

[53] https://www.coe.int/t/dghl/StandardSetting/InternetLiteracy/hbk_en.asp.

[54] https://www.unicef.org/publications/files/SOWC_2017_ENG_WEB.pdf.

[55] https://da2i.ifla.org/sites/da2i.ifla.org/files/uploads/docs/da2i-2017-full-report.pdf.

[56] https://www.itu.int/en/ITU-T/focusgroups/dfs/Documents/201703/ITU_FGDFS_Executive-summary.pdf.

[57] https://www.itu.int/en/ITU-T/extcoop/figisymposium/Pages/default.aspx.

[58] See http://unctad.org/en/Pages/CSTD/WSIS-UNSG-Report.aspx.

United Nations Office on Drugs and Crime for Member States officials, including those involved in law enforcement, reinforce human rights and gender mainstreaming. UNIDO prepared training material on knowledge-based management in the context of the UNIDO–UNEP Global Network on Resource-Efficient and Cleaner Production.

55. ITU has restructured its Centres of Excellence, which serve as focal points for professional development, research and knowledge sharing, under the umbrella of the ITU Academy.[59] It finalized the development of a new spectrum management training programme and is developing programmes concerned with climate change and the Internet of Things. ISOC and other Internet organizations hosted training activities and workshops in developing countries, with a focus on technical aspects of the Internet.

56. Gender disparity in science and technology has been a growing concern of the international community. ITU and the United Nations Entity for Gender Equality and the Empowerment of Women work with businesses and civil society organizations through the EQUALS partnership to promote gender equality in access, skills and leadership in the digital age.[60]

(e) Building confidence and security in the use of ICTs (C5)

57. Cybersecurity is an increasingly important aspect of information society development. ITU published the second edition of the Global Cybersecurity Index, which measures the legal, technical, organizational, capacity-building and cooperation commitments made by Member States. While illustrating improvements, this showed that there are significant gaps in cybersecurity awareness and engagement, stressing the need for improved cooperation between regions and stakeholders.[61]

58. The Global Cybersecurity Agenda, led by ITU, provides a framework for coordinating legal, technical, organizational and training needs.[62] National computer security incident response teams have been established in many countries. With other organizations, ITU is preparing a toolkit for the development, implementation and evaluation of national cybersecurity strategies.[63] The World Bank and ITU collaborated with other stakeholders to develop cybersecurity maturity models for developing countries.[64] ITU is also implementing a project to enhance cybersecurity in the least developed countries.[65]

59. The Online Trust Alliance issued a white paper on the shared responsibility of stakeholders (Securing the Internet of Things: A Collaborative and Shared Responsibility) and a revised version of the Internet of Things Security and Privacy Trust Framework.[66] The African Union and ISOC developed the Internet Infrastructure Security Guidelines for Africa, which highlight the importance of multi-stakeholder cooperation.[67]

60. ITU coordinates the Child Online Protection initiative.[68] The We Protect Global Alliance organized the Child Dignity in the Digital World Congress to address issues of child abuse.[69]

[59] https://academy.itu.int/index.php?lang=en

[60] https://www.equals.org/about-us

[61] https://www.itu.int/dms_pub/itu-d/opb/str/D-STR-GCI.01-2017-PDF-E.pdf

[62] https://www.itu.int/en/action/cybersecurity/Pages/gca.aspx

[63] https://www.itu.int/en/ITU-D/Cybersecurity/Pages/National-Strategies.aspx

[64] https://www.sbs.ox.ac.uk/cybersecurity-capacity/content/cybersecurity-capacity-maturity-model-nations-cmm-0

[65] https://www.itu.int/en/ITU-D/Cybersecurity/Pages/CYBLDC.aspx

[66] https://otalliance.org/system/files/files/initiative/documents/iot_sharedrolesv1.pdf; https://otalliance.org/system/files/files/initiative/documents/iot_trust_framework6-22.pdf

[67] https://www.internetsociety.org/resources/doc/2017/internet-infrastructure-security-guidelines-for-africa/

[68] https://www.itu.int/en/cop/Pages/default.aspx

[69] http://www.weprotect.org/child-dignity-in-the-digital-world-congress-2017

(f) *The enabling environment (C6)*

61. ITU assists Member States and businesses in developing pro-competitive policy and regulatory frameworks for telecommunications. In its first *Global ICT Regulatory Outlook* report, it emphasized progress towards a more open, collaborative regulatory approach within the countries concerned to implement the digital economy, but also noted growing market concentration and consolidation in ICTs.[70]

62. The ITU Global Symposium for Regulators, held in July, focused on the requirements and opportunities of digital transformation, including affordable access, ICT indicators and regulatory collaboration. It incorporated a global dialogue on digital financial inclusion, which emphasized the importance of cybersecurity.[71]

63. The Broadband Commission for Sustainable Development issued a report entitled "*The State of Broadband 2017: Broadband Catalysing Sustainable Development*", which assessed progress on access and affordability in 160 economies. It recommended that Governments should review regulatory frameworks and develop national broadband plans, encourage investment in infrastructure and benchmark developments in telecommunications and ICTs.[72]

64. Increased attention is paid to new technologies concerned with transport, including the development of autonomous vehicles, and with urban environments. The United for Smart Sustainable Cities initiative (U4SSC), which facilitates collaboration between United Nations and international agencies, published *U4SSC Deliverables: Enhancing Innovation and Participation in Smart Sustainable Cities*, which featured case studies.[73] The seventh Internet of Things Week, in June, demonstrated a wide range of new developments in the Internet of Things, concluding with the adoption of the Internet of Things Declaration to Achieve the Sustainable Development Goals.[74] ITU and ECE organized a symposium on the future networked car.[75]

65. Artificial intelligence is also expected to have a dramatic impact on sustainable development. ITU and the X Prize Foundation organized the Artificial Intelligence for Good Global Summit in June to consider potential applications of artificial intelligence to address global challenges including poverty, hunger, health, education and the environment.[76] The World Bank Published *Trouble in the Making? The Future of Manufacturing-Led Development*, which explored the implications of automation for manufacturing in developing countries.[77]

(g) *ICT applications (C7)*

E-government

66. DESA continued to promote e-government initiatives that support sustainable development following the outcomes of the latest *United Nations E-government Survey*,[78] which urged improvements in the security and quality of government services offered online, in benchmarking e-government, and in communication between government and citizens. An expert group meeting established the parameters for the 2018 E-government Survey, which will focus on e-government for sustainability and resilience.[79] DESA is also implementing a project to help the least developed countries build evidence-based e-government policies for public service delivery and accountability.

[70] https://www.itu.int/dms_pub/itu-d/opb/pref/D-PREF-BB.REG_OUT01-2017-SUM-PDF-E.pdf.

[71] https://www.itu.int/en/ITU-D/Conferences/GSR/Pages/GSR2017/default.aspx.

[72] http://news.itu.int/broadband-sustainable-development/.

[73] https://www.unccelearn.org/sites/default/files/inventory/enhancing.pdf.

[74] http://iot-week.eu/internet-of-things-declaration-to-achieve-the-sustainable-development-goals/.

[75] https://www.itu.int/en/fnc/2017/Pages/default.aspx.

[76] https://www.itu.int/en/ITU-T/AI/Pages/201706-default.aspx.

[77] http://www.worldbank.org/en/topic/competitiveness/publication/trouble-in-the-making-the-future-of-manufacturing-led-development.

[78] http://publicadministration.un.org/egovkb/en-us/Reports/UN-E-Government-Survey-2016.

[79] https://publicadministration.un.org/en/Research/UN-e-Government-Surveys/UNEGOV2018-Call-for-Contributions.

67. The United Nations Public Service Forum, held in June, addressed issues of public service innovation, including the potential of disruptive ICTs, such as artificial intelligence, big data and the Internet of Things, to reshape public service business models.[50]

E-business

68. The UNCTAD *Business-to-Consumer E-Commerce Index 2017* ranks countries according to their readiness for e-commerce.[51] The *Information Economy Report 2017: Digitalization, Trade and Development* addressed challenges identified by the Index, especially the relative disadvantage of some developing countries in the rapidly changing digital economy.[52] UNCTAD established the Intergovernmental Group of Experts on E-commerce and the Digital Economy to provide a platform for discussion of relevant policies and practice,[53] and launched a series of rapid e-trade readiness assessments for the least developed countries.[54]

69. The OECD *Digital Economy Outlook 2017* called on Governments to invest in skills, encourage greater use of advanced technologies and ensure that policymaking keeps pace with technological development.[55] UNCTAD launched the trade for all platform during E-commerce Week 2017, which attracted more than 1000 participants from 99 countries.[56]

70. WTO, the World Economic Forum and the Electronic World Trade Platform launched a joint initiative, Enabling E-commerce, which is oriented towards small businesses.[57] The International Trade Centre promotes e-commerce for small and medium-sized enterprises (SMEs) through its SME Trade Academy. It published a survey of the competitiveness of micro, small and medium-sized enterprises, *New Pathways to E-commerce*.[58]

71. During the 2017 WTO Global Review of Aid for Trade, OECD and WTO published *Aid for Trade at a Glance*, which included contributions from many international agencies on trade connectivity for inclusiveness and sustainable development.[59] This revealed the existence of a digital trade policy divide among Governments, as well as an apparent decline in the share of ICT in total aid for trade. Discussions are continuing about appropriate arrangements for e-commerce in WTO.

72. The United Nations Centre for Trade Facilitation and Electronic Business, led by ECE, develops trade facilitation recommendations and electronic business standards covering both commercial and government business processes.[60] The online Trade Facilitation Implementation Guide helps Governments and businesses implement the WTO Agreement on Trade Facilitation.[61] It is developing recommendations concerned with blockchain technologies and transboundary electronic transactions.

73. The Universal Postal Union organized a series of regional events concerned with postal services and e-commerce and will publish a report on the digital economy and postal activities in 2018. Almost all national post offices are now providing postal digital services, with a significant increase in those oriented towards e-commerce.

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[50] https://publicadministration.un.org/en/unps2017

[51] http://unctad.org/en/PublicationsLibrary/tn_unctad_ict4d09_en.pdf

[52] http://unctad.org/en/PublicationsLibrary/ier2017_en.pdf

[53] http://unctad.org/en/Pages/MeetingDetails.aspx?meetingId=1437

[54] http://unctad.org/en/Pages/Publications/E-Trade-Readiness-Assessment.aspx

[55] http://www.keepeek.com/Digital-Asset-Management/oecd/science-and-technology/oecd-digital-economy-outlook-2017_9789264276284-en#.WkNcN1Vl-Uk#page6

[56] http://unctad.org/en/PublicationsLibrary/dtlstict2017d7_en.pdf; https://etradeforall.org/

[57] https://www.wto.org/english/news_e/news17_e/ecom_11dec17_e.htm

[58] http://www.intracen.org/uploadedFiles/intracenorg/Content/Publications/New%20Pathways%20to%20E-commerce_Low%20res(2).pdf

[59] http://www.keepeek.com/Digital-Asset-Management/oecd/development/aid-for-trade-at-a-glance-2017_aid_glance-2017-en#.WldAXq5I-Uk#page5

[60] https://www.unece.org/cefact/

[61] http://tfig.unece.org/

E-learning

74. UNESCO partnered with Intel to launch the global ICT in Education Policy Platform to facilitate public debates on e-learning to improve education quality, advance inclusion and promote gender equality.[92] It is revising the *ICT Competency Framework for Teachers* to help educators incorporate social media and other new resources in educational practice, with special attention to persons with disabilities.[93]

75. UNESCO organized the second World Open Educational Resources Congress in September. The Congress adopted the Ljubljana Action Plan and Ministerial Declaration, including recommendations to maintain open-licensed resources to facilitate quality and lifelong education.[94] A dedicated hub for open educational resources has also been developed.[95]

76. The Broadband Commission Working Group on Education issued a report on digital skills for life and work, designed to assist Member States in defining skills and mainstreaming strategies to support educational development.[96] ISOC published a brief for policymakers entitled "Internet Access and Education",[97] as well as a detailed review of education challenges and opportunities for the Internet in Africa.[98]

E-health

77. WHO promotes e-health within the United Nations system and works with other agencies through the Health Data Collaborative to strengthen health information systems.[99] It emphasizes the need to build a strong e-health foundation, including infrastructure, standards, legislation and human capacity, in order to achieve the potential benefits of ICTs in meeting health-related Sustainable Development Goals. More than 120 countries now have ICT strategies for health, with increased adoption of mobile and wireless technologies apparent in health promotion, clinical care and emergency response.

78. ITU and WHO collaborate in the Be Healthy, Be Mobile initiative, which seeks to improve health services by delivering information over mobile networks.[100] They worked with the Institute of Electrical and Electronics Engineers to organize the first WSIS hackathon, Hack for Health, at the WSIS Forum in June.

79. The World Food Programme acts as global lead agency for the Emergency Telecommunications Cluster of international organizations, which facilitated communications in 2017 in response to natural and humanitarian crises in Africa, the Arab States and the Caribbean.[101]

E-employment

80. Debate continued in 2017 about the potential impact of new technologies, including artificial intelligence and robotics, on the nature and volume of employment. ILO established the Global Commission on the Future of Work, which will report in 2019.[102]

[92] https://ictedupolicy.org/.

[93] http://www.unesco.org/new/en/communication-and-information/access-to-knowledge/unesco-ict-competency-framework-for-teachers/.

[94] http://www.oercongress.org/.

[95] https://www.oercommons.org/hubs/UNESCO.

[96] http://unesdoc.unesco.org/images/0025/002590/259013e.pdf.

[97] https://www.internetsociety.org/resources/doc/2017/internet-access-and-education/.

[98] https://www.internetsociety.org/wp-content/uploads/2017/08/InternetEducationAfrica_report_FINAL.pdf.

[99] https://www.healthdatacollaborative.org/.

[100] https://www.itu.int/en/ITU-D/ICT-Applications/eHEALTH/Be_healthy/Pages/Be_Healthy.aspx.

[101] https://www.etcluster.org/about-etc/etc-leadership.

[102] http://www.ilo.org/global/topics/future-of-work/WCMS_569528/lang--en/index.htm.

81. DESA published a study of the impact of technological change on labour markets and income distribution that stressed the need for innovative policy development by Governments and international agencies.[103] In a similar vein, the UNCTAD *Trade and Development Report* considered the impact of robotics on employment.[104]

82. ITU and ILO launched the Digital Skills for Decent Jobs for Youth Campaign, which aims to train five million young people with job-ready digital skills by 2030.[105] The World Bank and the Rockefeller Foundation launched the Digital Jobs Africa initiative, which also aims to foster digital employment for the young.[106]

E-environment

83. ECE promotes information sharing on environmental issues through the Aarhus Convention,[107] the Protocol on Pollutant Release and Transfer Registers[108] and support for the Shared Environmental Information System of the European Environment Agency.[109]

84. The Global E-waste Statistics Partnership was formed by ITU, the United Nations University and the International Solid Waste Association.[110] The first *Global E-waste Monitor* reported that total e-waste would exceed 50 million tons per annum by 2020, causing significant environmental harm, as well as a loss of raw materials.[111]

85. The WMO Information System represents a major upgrade for information sharing on climate, marine and related environmental information and is being further developed to maximize the value of new ICTs. A task force established by ITU, WMO and the Intergovernmental Oceanographic Commission of UNESCO is working to enhance the capabilities of communications cable networks to provide earthquake and tsunami warnings and gather data on oceanic climate change.[112]

E-agriculture

86. FAO coordinates the implementation of e-agriculture within the United Nations system. It manages the E-agriculture Community of Practice, which facilitates online knowledge sharing on agriculture and rural development.[113]

87. In 2017, FAO focused on the development of regulatory policies and national plans to increase rural access to communications and digital resources. It signed a collaborative agreement with ITU to facilitate the development of e-agriculture policies and innovation, building on their joint e-agriculture strategy framework.[114] Also in conjunction with ITU, it published a compilation of case studies entitled "*E-agriculture in Action*".[115] FAO, ITU and the Institute of Electrical and Electronics Engineers are preparing the Hackathon against Hunger, to be held during the WSIS Forum in 2018.[116]

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[103] https://www.un.org/development/desa/dpad/wp-content/uploads/sites/45/publication/2017_Aug_Frontier-Issues-1.pdf.

[104] http://unctad.org/en/PublicationsLibrary/tdr2017_en.pdf.

[105] https://sustainabledevelopment.un.org/partnership/?p=23539.

[106] https://www.rockefellerfoundation.org/our-work/initiatives/digital-jobs-africa/.

[107] https://www.unece.org/fileadmin/DAM/env/pp/documents/cep43e.pdf.

[108] https://www.unece.org/fileadmin/DAM/PRTR_Protocol_e.pdf.

[109] https://www.eea.europa.eu/about-us/what/shared-environmental-information-system-1/shared-environmental-information-system.

[110] https://www.itu.int/en/ITU-D/Climate-Change/Pages/ewaste/globalewastestatistic spartnership.aspx.

[111] https://www.itu.int/en/ITU-D/Climate-Change/Documents/GEM%202017/Global-E-waste%20Monitor%202017%20-%20Executive%20Summary.pdf.

[112] https://www.itu.int/en/ITU-T/climatechange/task-force-sc/Pages/default.aspx.

[113] http://www.e-agriculture.org/e-agriculture.

[114] http://www.fao.org/news/story/en/item/1038205/icode/; http://www.fao.org/3/a-i5564e.pdf.

[115] http://www.fao.org/3/a-i6972e.pdf.

[116] http://www.e-agriculture.org/news/wsis-hack-against-hunger-submissions-are-open.

88. The World Bank published a fully updated edition of *ICT in Agriculture* (e-sourcebook), focused on the requirements of small-scale farmers.[117]

E-science

89. The second Multi-stakeholder Forum on Science, Technology and Innovation for the Sustainable Development Goals, held in May, called on Governments to promote citizen participation in the collection, analysis and sharing of data, and urged the United Nations to develop integrated information approaches to the Sustainable Development Goals based on geographic information systems and geospatial technology.[118]

90. ITU published a toolkit for strengthening ICT-centric ecosystems, *Bridging the Digital Innovation Divide*, to help countries develop national digital innovation frameworks.[119]

91. UNESCO promotes open access to scholarly research and publications in developing countries. FAO, UNEP, WHO and WIPO collaborate in the Research4Life programme, which offers preferential access to developing countries for peer-reviewed journals concerned with scientific research, health, agriculture and the environment.[120] The WIPO programme, Access to Research for Development and Innovation, offers access to almost 28,000 journals to over 900 registered institutions.[121]

(h) Cultural diversity and identity, linguistic diversity and local content (C8)

92. UNESCO integrates WSIS outcomes into its work on cultural and linguistic diversity, the protection and promotion of digital heritage and support for creative industries. It issued a global report entitled "*Reshaping Cultural Policies: Advancing Creativity for Development 2018*", which examined the use of digital and interactive content and technology in the cultural and creative industries and made recommendations on the issue.[122] New guidelines were adopted for interpreting and implementing the Convention on the Protection and Promotion of the Diversity of Cultural Expressions in the digital age.

93. The protection and promotion of heritage, including the digitalization of existing materials and the preservation of digital heritage, has been an ongoing focus of UNESCO. It has worked with the United Nations Institute for Training and Research to monitor and evaluate damage to historic monuments during conflict using satellite technology, especially in the Syrian Arab Republic.[123]

(i) Media (C9)

94. Discussion has continued on the changing media environment resulting from the spread of social media, changes in advertising and media business models, the proliferation of news sources operating outside traditional journalistic norms and the impact of new media, including social media, on elections and decision-making processes. There has been growing concern about the alleged dissemination of misinformation and disinformation online.

[117] http://documents.worldbank.org/curated/en/522141499680975973/pdf/117319-PUB-Date-6-27-2017-PUBLIC.pdf.

[118] http://www.un.org/ga/search/view_doc.asp?symbol=E/HLPF/2017/4&Lang=E, para. 41.

[119] https://www.itu.int/en/ITU-D/Innovation/Documents/Publications/Policy_Toolkit-Innovation_D012A0000D13301PDFE.pdf.

[120] http://www.research4life.org/.

[121] http://www.wipo.int/ardi/en/.

[122] http://unesdoc.unesco.org/images/0026/002605/260592e.pdf.

[123] http://unosat.web.cern.ch/unosat/unitar/downloads/chs/FINAL_Syria_WHS.pdf.

95. UNESCO published a new edition of *World Trends in Freedom of Expression and Media Development*, which raised concerns about pluralism and restrictions on media freedom.[124] The General Assembly adopted a resolution on the safety of journalists and the issue of impunity (A/RES/72/175), and UNESCO held a multi-stakeholder consultation on strengthening the United Nations plan of action on this issue.[125]

96. World Press Freedom Day 2017 was celebrated in May with 139 national events around the world. An international conference saw the adoption of the Jakarta Declaration on media's role in advancing peaceful, just and inclusive societies.[126]

97. The UNESCO International Programme for the Development of Communication supports media development projects in individual countries, as well as programmes of work concerned with media capacity to monitor and report on climate change, and work to develop indicators for Internet Universality.[127]

(j) Ethical dimensions of the information society (C10)

98. The United Nations Human Rights Council adopted a resolution on the right to privacy in the digital age.[128] In addition, the Special Rapporteur on the promotion and protection of the right to freedom of opinion and expression prepared a report on the human rights aspects of digital access.[129]

99. UNESCO has developed the concept of Internet Universality as a framework for the future development of the Internet, built around the core principles of rights, openness, accessibility to all and multi-stakeholder participation. With the support of APC, it has launched a consultation exercise to develop indicators for Internet Universality that can be used to monitor progress and identify appropriate policy initiatives in individual countries. The resulting indicators will be published in 2018.[130]

100. UNESCO published a report entitled "*Youth and Violent Extremism on Social Media: Mapping the Research*",[131] as well as the results of a survey on privacy in media and information literacy with youth perspectives.[132]

101. The IGF provides a forum for the discussion of digital rights issues, including privacy, data protection and freedom of expression. A digital rights session at the 2017 Forum, organized by national and regional IGFs, emphasized the equivalence of rights online and offline, and the importance of access as a precondition to exercising rights online.

102. The World Bank issued a publication entitled "Principles on Identification for Sustainable Development: Towards the Digital Age". The report explored the developmental value and privacy implications of digital identity.[133]

(k) International and regional cooperation (C11)

103. The value of ICTs to development was emphasized at the United Nations High-level Political Forum held in July. Its declaration emphasized the disruptive and transformative potential of innovation, new technology and know-how, and their potential for development.[134]

[124] https://en.unesco.org/world-media-trends-2017

[125] https://en.unesco.org/sites/default/files/report_-_multi-stakeholder_consultation.pdf

[126] https://en.unesco.org/sites/default/files/jakarta_declaration_4may2017_en.pdf

[127] http://unesdoc.unesco.org/images/0025/002585/258528e.pdf

[128] A/HRC/RES/34/7

[129] A/HRC/35/22

[130] https://en.unesco.org/internetuniversality/indicators

[131] http://unesdoc.unesco.org/images/0026/002603/260382e.pdf

[132] http://unesdoc.unesco.org/images/0025/002589/258993e.pdf

[133] http://documents.worldbank.org/curated/en/213581486378184357/pdf/112614-REVISED-English-ID4D-IdentificationPrinciples.pdf

[134] E/HLS/2017/1

104. The second Forum on Science, Technology and Innovation, held in May, called for increased bandwidth to be made available to address the "under connection" that undermines development, and for the development of new technology business models suited to the needs of the least developed countries.[135]

105. Leaders of 29 United Nations agencies contributed to a report entitled "*Fast-forward progress: Leveraging tech[nology] to achieve the global goals*", which dealt with the potential of a networked society.[136]

106. The European Union launched an initiative called Digital4Development to promote broadband connectivity, digital literacy, digital entrepreneurship and the use of ICTs for sustainable development, building on past experience of financial and technical assistance for infrastructure and ICT for development.[137]

2. Implementation of themes

(a) Financing mechanisms

107. Private investment is the main source of ICT sector finance. Investment in digital development by multinational enterprises was assessed in the UNCTAD *World Investment Report 2017: Investment and the Digital Economy*, which proposed an investment policy framework for the digital age.[138] Public–private partnerships add significantly to the range of investment initiatives for infrastructure and services in developing countries.

108. International financial institutions and donors also contribute to financing infrastructure. A total of $5.9 billion in concessional financing and $7.9 billion in non-concessional financing for ICT connectivity was reported to OECD for the period 2006–2015. Most of the financing was provided by the European Union, Japan, the Republic of Korea, the United Kingdom of Great Britain and Northern Ireland and the World Bank Group. The combination of official development assistance with foreign direct investment is particularly relevant to countries facing economic and geographic challenges. The World Bank, for example, supports the Pacific Region Connectivity Programme, which finances submarine cables connecting small island developing States in the Pacific region.[139]

(b) Internet governance

Enhanced cooperation

109. The Tunis Agenda for the Information Society called for enhanced cooperation to enable Governments to carry out, on an equal footing, their roles and responsibilities in international public policy issues pertaining to the Internet.[140]

110. In 2015, the General Assembly requested the Chair of the Commission for Science and Technology for Development, through the Economic and Social Council, to establish a working group to develop recommendations on how to further implement enhanced cooperation as envisioned in the Tunis Agenda, with the full involvement of all relevant stakeholders. The working group held five meetings between September 2016 and January 2018. In his report, the Chair of the working group noted that although sometimes consensus seemed to emerge on some issues, significant divergence of views on a number

[135] https://sustainabledevelopment.un.org/index.php?page=view&type=13&nr=1986&menu=2993; http://www.un.org/ga/search/view_doc.asp?symbol=E/HLPF/2017/4&Lang=E.

[136] https://www.itu.int/en/sustainable-world/Documents/Fast-forward_progress_report_4147009%20FINAL.pdf.

[137] https://ec.europa.eu/digital-single-market/en/blog/digital4development-new-approach-eus-development-tool-kit.

[138] http://unctad.org/en/PublicationsLibrary/wir2017_en.pdf.

[139] http://www.worldbank.org/en/news/feature/2013/05/17/information-communication-revolution-in-the-pacific.

[140] http://www.itu.int/net/wsis/docs2/tunis/off/6rev1.html.

of other issues persisted, including with respect to what should be the nature, purpose and scope of the process towards enhanced cooperation. The complexity and political sensitivity of the topic did not allow the working group to agree on a set of recommendations. The report[141] will be presented to the Commission for consideration at its twenty-first session.

Internet Governance Forum

111. The theme of the twelfth annual IGF, which took place in December in Geneva, Switzerland, was "Shape your digital future!". More than 2,000 people from 142 countries attended the Forum, which featured some 200 workshops and other sessions, while a further 1,500 participated online, many using 32 remote hubs established for the meeting.[142] Almost 100 Governments were represented, while more than 20 intergovernmental organizations participated in a "digital Geneva track".

112. Plenary sessions focused on the relationship between local interventions and global impacts, the Internet and sustainable development, the future of digital global governance, the impact of digitization on politics, public trust and democracy, gender inclusion and global cooperation for cybersecurity. A special session was held on data road maps for sustainable development.[143] The host country (Switzerland), the Multi-Stakeholder Advisory Group and Secretariat of the Forum delivered a series of "Geneva messages", summarizing the main sessions, which were published online to facilitate discussion.[144]

113. The Multi-stakeholder Advisory Group and Secretariat continued to implement initiatives to improve the working of the Forum. Intersessional activities continued to grow, including continued work on Policy Options for Connecting the Next Billion(s) and Best Practice Forums in 2017 on cybersecurity, gender and access, and local content. The Advisory Group has established working groups on new session formats, further Forum improvements and a multi-year strategic work programme.

114. The number of national, regional and youth IGFs has grown rapidly, reaching 97 in 2017. Linkages between these have intensified. The 2017 edition of the APC *Global Information Society Watch* presented case studies of national and regional IGF initiatives.[145]

(c) Measuring information and communications technology for development

115. The Partnership on Measuring ICT for Development is a collaborative forum of 14 United Nations agencies and other agencies concerned with data collection and analysis on ICT for development and WSIS outcomes. It submitted a thematic review of the cross-cutting impact of ICTs on the Sustainable Development Goals to the United Nations High-level Policy Forum in July.[146] It also set up a task group on ICTs for development, which will prepare a thematic list of ICT indicators to support monitoring of progress towards the achievement of the Sustainable Development Goals.

116. ITU maintains the world telecommunication/ICT indicators database, which includes more than 180 indicators from over 200 economies. *ICT Facts and* Figures, an ITU publication, summarized the latest data and paid particular attention to youth access and use.[147] Progress towards achieving goals for growth, inclusiveness, sustainability and innovation that were adopted in the ITU Connect 2020 Agenda is summarized in the Organization's *Annual Report*.[148]

[141] E/CN.16/2018/CRP.3.

[142] https://www.intgovforum.org/multilingual/content/igf-2017-attendance-programme-statistics.

[143] https://www.intgovforum.org/multilingual/content/igf-2017-geneva-messages.

[144] https://www.intgovforum.org/multilingual/content/igf-2017-geneva-messages.

[145] https://www.giswatch.org/sites/default/files/giswatch17_web.pdf.

[146] https://sustainabledevelopment.un.org/content/documents/14826ict.pdf.

[147] https://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2017.pdf.

[148] https://www.itu.int/en/annual-report-2016/goals/Pages/default.aspx; https://www.itu.int/en/connect2020/Pages/default.aspx.

117. The ITU publication, *Measuring the Information Society Report 2017*, presented findings for 11 indicators of ICT access, usage and skills that are included in the ICT development index, a comprehensive measure which enables international comparisons of progress towards the Information Society. For the first time, this report included detailed information concerning access and use in 176 separate economies, almost all of which improved their index values between 2016 and 2017. [149]

118. Revised indicators for the ICT development index from 2018 were agreed during the ITU World Telecommunication/ICT Indicators Symposium, which discussed the role of data in formulating public policies to foster a healthy investment climate, as well as the use of big data for monitoring the information society and smart data for smart sustainable cities.[150]

119. Detailed research on access and use in developing countries, derived from household surveys, was completed by Research ICT Africa, LIRNEasia and Dirsi. [151] The Global System for Mobile Communications Association also published data on the extent of access and use of mobile services.

120. UNCTAD piloted a model survey for measuring exports of ICT and ICT-enabled services, [152] while OECD explored parameters for measuring digital trade. [153] UNESCO continued its work to establish Internet Universality indicators (see above).[154]

IV. Findings and suggestions

121. There has been continued progress in the access, use and application of ICTs, but much more needs to be done in order to achieve internationally agreed goals of connectivity for all and to maximize the value of ICTs in sustainable development.

122. Progress towards inclusion in the Information Society remains highly unequal. Many people, particularly in low-income countries, are unable to benefit from ICTs because of poor connectivity, high costs and lack of necessary skills. These disadvantages are likely to increase as the pace of innovation in technology intensifies. International multi-stakeholder cooperation is needed to address this, alongside challenges such as cybersecurity which could jeopardize public trust in the Internet and online services, and thereby their developmental impact.

123. Since WSIS, there have been many new developments in ICTs, and their impact on economies and societies is constantly changing. The nature of the Information Society is constantly changing as new technologies emerge and applications are introduced. It is widely agreed that a new wave of technological innovation is likely to bring about much more radical changes in our economies and societies. Countries, companies and individuals that invest in the infrastructure and capabilities required to take advantage of these new technologies are likely to improve their competitiveness in global markets. Those who lack the resources to do so, however, are likely to be disadvantaged. The quality of infrastructure will be crucially important in enabling many new technologies, particularly those requiring real-time connectivity. Governments and other stakeholders, however, can also enhance prospects for improved economic and social welfare through a judicious selection of appropriate policy approaches and implementation plans.

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[149] https://www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2017/MISR2017_Volume1.pdf.

[150] https://www.itu.int/en/ITU-D/Statistics/Pages/events/wtis2017/default.aspx.

[151] https://researchictafrica.net/wp/wp-content/uploads/2018/01/AfterAccess_IGF2017-1-2.pdf.

[152] http://unctad.org/en/PublicationsLibrary/tn_unctad_ict4d03_en.pdf.

[153] http://unctad.org/meetings/es/Contribution/dtl_eWeek2017c04-oecd_en.pdf.

[154] https://en.unesco.org/internetuniversality.

124. In many countries, the Information Society is no longer a vision of the future, but a current reality. It has already had profound effects on the ways in which Governments, businesses and citizens interact with one another, on information rights and economic structures. While not yet universal, these effects are increasingly felt in all countries, and emerging technologies will intensify them in the future. They pose challenges to both national and international governance, including the regulation of online markets, the role and responsibilities of global corporations, and the relationship between different national jurisdictions. International dialogue concerning these issues will continue and intensify over the coming years.

125. The WSIS outcome documents set out the principles which the international community should follow in shaping a "people-centred, inclusive and development-oriented Information Society"[155] which contributes to the three pillars of sustainable development: economic prosperity, social equity and environmental sustainability. These principles were reaffirmed by the General Assembly in 2015. The challenge before the international community, and all stakeholders, is to ensure continued advancement of those principles, towards those goals, in the context of rapid, unpredictable changes in technology.

[155] WSIS-03/GENEVA/DOC/4-E.